UNIVERSITI SAINS MALAYSIA

Peperiksaan Semester Kedua
Sidang Akademik 2009/2010

April 2010

EEM 421 – KAEDAH KUALITI

Masa : 3 jam

ARAHAN KEPADA CALON:

Sila pastikan bahawa kertas peperiksaan ini mengandungi **LIMA (5)** muka surat berserta Lampiran **SATU (1)** muka surat bercetak sebelum anda memulakan peperiksaan ini.

Jawab **SEMUA** soalan.

Gunakan dua buku jawapan yang diberikan supaya jawapan-jawapan bagi soalan **1 DAN 2** adalah di dalam satu buku jawapan dan bagi soalan **3 HINGGA 5** di dalam buku jawapan yang lain.

Mulakan jawapan anda untuk setiap soalan pada muka surat yang baru.

Agihan markah bagi soalan diberikan di sudut sebelah kanan soalan berkenaan.

Jawab semua soalan di dalam Bahasa Malaysia atau Bahasa Inggeris atau kombinasi kedua-duanya.

[Sekiranya terdapat sebarang percanggahan pada soalan peperiksaan, versi Bahasa Inggeris hendaklah diguna pakai].

…2/-

1. (a) Jelaskan perbezaan berikut:
Define the difference of the following:

(i) Spesifikasi dan penerimaan
Specification and tolerances

(ii) Productiviti dan kualiti
Productivity and quality

(6 marks)

(b) Prinsip kualiti telah berkembang melalui peredaran masa. Terangkan perkembangan dan perbezaan falsafah bagi kualiti yang bermula dari pertukangan, pemeriksaan, pengawalan kualiti, pengawalan kualiti berperangkaan, pengurusan kualiti menyeluruh sehingga pembaikan berterusan.

Quality principles have evolved over time. Describe the evolution and philosophical differences of quality starting from artisan, inspection, quality control, statistical quality control, statistical process control, total quality management up to continuous improvement.

(14 marks)

2. (a) Selain daripada rajah sebab dan akibat yang di bina oleh Dr Ishikawa, senaraikan mana-mana **TIGA (3)** alat kualiti yang lain dan terangkan tujuan setiap alat tersebut.

*Other than the cause and effect diagram developed by Dr Ishikawa, list any other **THREE (3)** quality tools and describe the purpose of each tool.*

(6 marks)

(b) Bincangkan **DUA (2**) andaian tidak benar yang dibuat oleh orang ramai mengenai kualiti dan bagaimanakah cara anda menolaknya? Seterusnya, bincangkan **EMPAT (4)** kemutlakan Crosby mengenai pengurusan kualiti.

Discuss any TWO (2) erroneous assumption that people made about quality and how would you argue against them? Hence, discuss the ***FOUR (4)*** *Crosby's absolutes of quality management.*

(14 marks)

3. (a) Nyatakan penyebab variasi dan jelaskan setiap satu daripada penyebab secara terperinci.
State the causes of variation and explain each of the causes in detail.

(5 marks)

(b) Nyatakan jenis variasi dan jelaskan bagaimana setiap jenis variasi dapat dikurangkan atau dihapuskan.

State the types of variation and explain how the variation type can be reduced or eliminated.

(5 marks)

(c) Beri pendapat anda mengenai kenyataan berikut. "Sebuah proses yang berada di dalam keadaan kawalan berperangkaan tidak akan menghasilkan produk yang defektif ".

State your opinion regarding the following statement. " A process that is in statistical control will not produce defective products".

(10 marks)

4. (a) Apakah kegunaan perangkaan induktif dalam bidang Kualiti?
What are inductive statistics used for in Quality?

(5 marks)

(b) Nyatakan salah satu teknik grafik yang boleh digunakan untuk perangkaan induktif and terangkan kegunaannya.

State a graphical technique that can be used in inductive statistics and explain the uses of the technique.

(5 marks)

(c) Apakah kegunaan Jadual Z? Berikan satu contoh yang sesuai untuk menunjukkan kegunaan Jadual Z

What is the use of the Z Table? Give one suitable example to illustrate the use of the Z Table.

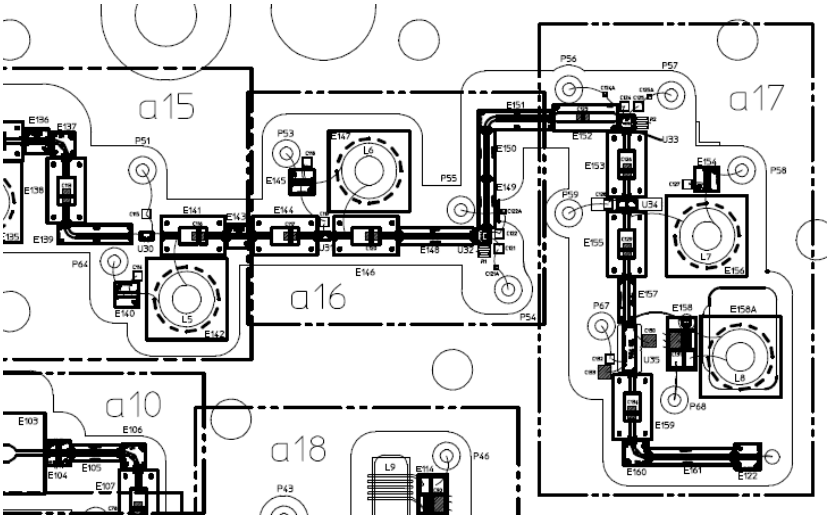
.(10 marks)

5. Seorang jurutera PCB ingin menjalankan suatu kajian untuk pemuat (C01) dari AVX (X) dan MicroTech (Y) pada Papan Litar Cetak (PLC) yang telah direkakan. Jurutera tersebut telah memperoleh sebanyak 30 sampel pemuat daripada X dan Y dan menjalankan ujikaji pada Pelan PLC itu. Keputusan ujikaji menggunakan "Statgraphic Software" adalah seperti ditunjukkan di Rajah 4. Seterusnya isi tempat kosong seperti yang diberi pada Kertas Jawapan yang disertakan pada Lampiran.

A PCB Engineer would like to perform a study on Capacitor (C01) from AVX (X) and MicroTech (Y) on the designed Printed Circuit Board (PCB). The engineer had samples of 30 pieces of capacitors each and ran the experiment with both suppliers' capacitors on the PCB Layout. Results from the experiment using Statgraphic Software is shown in Figure 4. Hence fill in the blanks in the Answer sheet as attached in Appendix.

(20 marks)

Tests for Normality for AVX
Computed Chi-Square goodness-of-fit statistic = 19.0
P-Value = 0.0885285
Shapiro-Wilks W statistic = 0.892706
P-Value = 0.00553212
Z score for skewness = 2.00008
P-Value = 0.0454911
Z score for kurtosis = 1.92781
P-Value = 0.0538781
Tests for Normality for MicroTech
Computed Chi-Square goodness-of-fit statistic = 28.0
P-Value = 0.00553205
Shapiro-Wilks W statistic = 0.934384
P-Value = 0.0751981
Z score for skewness = 0.557159
P-Value = 0.577416
Z score for kurtosis = -1.83035
P-Value = 0.0671977
Comparison of Means (assuming equal variances)
95.0% confidence interval for mean of AVX:
0.810667 +/- 0.0365854 [0.774081,0.847252]
95.0% confidence interval for mean of MicroTech:
0.852 +/- 0.0401741 [0.811826,0.892174]
95.0% confidence interval for the difference between the means
assuming equal variances: -0.0413333 +/- 0.0531804 [-0.0945138,0.0118471]
t test to compare means
Null hypothesis: mean1 = mean2
Alt. hypothesis: mean1 NE mean2
assuming equal variances: t = -1.55579 P-value = 0.125197
Comparison of Means (not assuming equal variances)
95.0% confidence interval for mean of AVX:
0.810667 +/- 0.0365854 [0.774081,0.847252]
95.0% confidence interval for mean of MicroTech:
0.852 +/- 0.0401741 [0.811826,0.892174]
95.0% confidence interval for the difference between the means
not assuming equal variances: -0.0413333 +/- 0.0531903 [-0.0945236,0.0118569]
t test to compare means
Null hypothesis: mean1 = mean2
Alt. hypothesis: mean1 NE mean2
not assuming equal variances: t = -1.55579 P-value = 0.125244



Variance Check
Cochran's C test: 0.546651 P-Value = 0.617621
Bartlett's test: 1.00438 P-Value = 0.617598
Hartley's test: 1.2058
Levene's test: 0.726877 P-Value = 0.397404
Comparison of Medians
Median of sample 1: 0.8
Median of sample 2: 0.83
Mann-Whitney (Wilcoxon) W test to compare medians
Null hypothesis: median1 = median2
Alt. hypothesis: median1 NE median2
Average rank of sample 1: 26.7833
Average rank of sample 2: 34.2167
W = 561.5 P-value = 0.0994281

Rajah 4
Figure 4

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LAMPIRAN **(EEM 421)**
APPENDIX

ATTACHMENT:
(Please remove and attached together with your answer script)

ANSWER SHEET FOR QUESTION 5

Hypothesis Statement:

Ho : AVX (X) and MicroTech (Y) capacitors are similar.

H_A : _____

Normality Test;

- AVX (X) _____ (p =_____),

- MicroTech (Y) _____(p = _____)

Since data _____,

Variance Check

Data Not Normal *Or* Normal; -Ho : $\sigma_X = \sigma_Y$; H_A: $\sigma_X \neq \sigma_Y$

_____ Test, p = _____, therefore σ between AVX (X) and MicroTech (Y) capacitors is _____.

Test for _____;_____,

-Ho : $_X =$ $_Y$; H_A : $_X \neq$ $_Y$

-P = _____, therefore _____ is _____ significantly different for capacitor value.

Results:

Since _____ Test and _____ show _____ difference; thus Accept _____.

Conclusions:

_____.